

Amendments to the Drawings

The attached sheet of drawings includes changes to Fig. 1A, wherein reference number 211 has been deleted because it is not referred to in the specification, as per the Examiner's request.

Attachment: Replacement Sheet

Annotated Sheet Showing Changes

REMARKS

Objection to Drawings

The drawings are objected to under 37 CFR 1.84(p)(5) because element "211" in Fig. 1A is not mentioned in the specification. Applicants propose deleting element 211 from Fig. 1A. Proposed drawing corrections in red ink along with corrected drawings in accordance with the proposed changes are enclosed herewith.

Objection to the Specification

The specification is objected to for not identifying the related applications. The specification has been amended to identify the related applications.

The abstract has also been amended to correspond to the claims.

Objection to the Claims

Claim 12 is objected to for incorrect grammar, and has been amended as per the Examiner's suggestion.

Rejection under 35 U.S.C §103

Claims 12-18 are pending in the application and stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,759,233 to Schwab in view of U.S. Pat. No. 4,744,958 to Pircon. In particular, the Examiner found that Schwab discloses all elements of claim 12 including an impingement plate that is horizontally located, but is silent as to the plate being solid. The Examiner further found that Pircon teaches the use of a horizontal solid impingement plate in a method for removing impurities from a gas stream wherein there is no appreciable pressure drop. The Examiner thus opined that it would have been obvious to one of ordinary skill in the art to use the horizontal solid impingement plate of Pircon as the impingement plate of Schwab as it is merely the substitution of functionally equivalent structures with a reasonable expectation of success, which the Examiner appears to base upon the teaching of Pircon of avoiding appreciable pressure drop combined with Schwab's disclosure that it is desirable to control pressure drop in the system.

Applicants have reviewed the cited references with care, paying particular attention to the passages identified by the Examiner, and are compelled to respectfully disagree with the Examiner's understanding of these references. Schwab teaches the use of liquid in conjunction with impingement plates in the embodiment of Fig. 7, wherein three stages of impingement plates 795 are provided and a spray of cooling liquid is introduced into the gas flow upstream of impingement plates 795 by nozzle 725 and downstream of the plates by liquid feed 791, and a contaminated flow of particle-laden effluent gas enters enclosed chamber 730 through inlet 727 and then passes through the three stages of impingement plates 795. As is well known in this art, the impingement plates 795 require a liquid flow over them. The cooling liquid being output from the nozzle 725 is sprayed toward the front stage of the impingement plates 795, while the rear stage of the impingement plates 795 is directly moisturized by the liquid output from the liquid feed 791. Thus, the effluent flow first travels through the impingement plates 795, such that the impingement plates 795 serve to aid in the cooling of the gas flow and to remove larger particulates from the gas flow.

The nozzle 725 is shown as being spaced from impingement plates 795 and thus most of the cooling liquid output from the nozzle 725 is mixed with the effluent flow before it reaches to the impingement plates 795. Similarly, the liquid injected into the system above the impingement plates 795 by liquid feed 791 is also intermixed with the effluent flow by the time it reaches the impingement plates 795. Thus, in the system of Schwab, the liquid output from the nozzle 725 and the liquid feed 791 is immediately mixed with the effluent flow traveling therethrough, and it is in fact this mixture of effluent flow and liquid that is actually deposited onto the impingement plates 795. Thus, Schwab does not in fact teach spraying liquid toward a solid horizontally located surface so that the liquid impinges on the solid horizontally located surface to form a film of liquid around the solid horizontally located surface and passing the effluent gas through the film of liquid to remove the impurities therefrom. Schwab first intermixes fluid with effluent gas and then deposits this mixture upon impingement plates. Applicants thus respectfully submit that Schwab does not in fact disclose any of the limitations of claims 12 and 18.

Pircon in FIG. 1 discloses a nozzle 23 have an impingement plate 31 for removing liquid and solid particulates from the gas stream before the clean gas outlet. The impingement plate 31

is of sufficient size to have substantially all of the liquid-solid matter from the outlet of nozzle 23 impinge upon it while affording sufficient area between the impingement plate and cylinder 10 to allow passage of the gas around the impingement plate 31 without an appreciable drop in pressure. To achieve this goal while the gas stream passes through the nozzle 23, the site of the impingement plate 31 in the cylinder 10 has to be properly adjusted according to the location of the nozzle 23 and the inner wall of the cylinder 10 as well as the flow rate of the gas stream. Thus, it is assumed that in Pircon the size of the impingement plate 31 is mainly designed so that the nozzle 23 does not generate an appreciable pressure drop around the impingement plate 31. At column 4, lines 15-23, Pircon discloses that "nozzle 23 ... does have an impingement means for removing liquid and solid particulates from the gas stream before the clean gas outlet. A suitable impingement plate is shown as 31 in FIG. 1. Impingement plate 31 is of sufficient size to have substantially all of the liquid-solid matter from the outlet of nozzle 23 impinge upon it while affording sufficient area between the impingement plate and cylinder 10 to allow passage of the gas around impingement plate without appreciable pressure drop." [emphasis added] Pircon does not in fact disclose a "solid" impingement plate or the like, and the term "solid" is actually related to the "liquid-solid matter" in the gas, not to the constitution of impingement plate 31.

Applicants have amended the claims to make the differences between the prior art and the claimed invention more clear. These amendments are made solely for the purpose of clarifying the scope of the claims and assisting the Examiner in identifying the differences between the cited art and the claims. Applicants expressly note that therefore these amendments are not made for purposes related to patentability, because the amendments do not alter the scope of the claims, but rather merely clarify it.

In light of the above, Applicants submit that independent claims 12 and 18 are now allowable and respectfully requests the Examiner to reconsider and pass the claims to issue.

Claims 14-17 depend from claim 12. In view of the above discussion, it is submitted that claim 12 is allowable, and for this reason claims 14-17 are also allowable. Claim 13 has been cancelled without prejudice.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

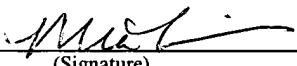
I hereby certify that this correspondence is being deposited with the United States Post Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

October 9, 2003

(Date of Transmission)

Mia Kim

(Name of Person Transmitting)

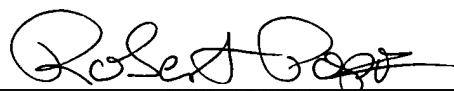


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10/9/03

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Attachments

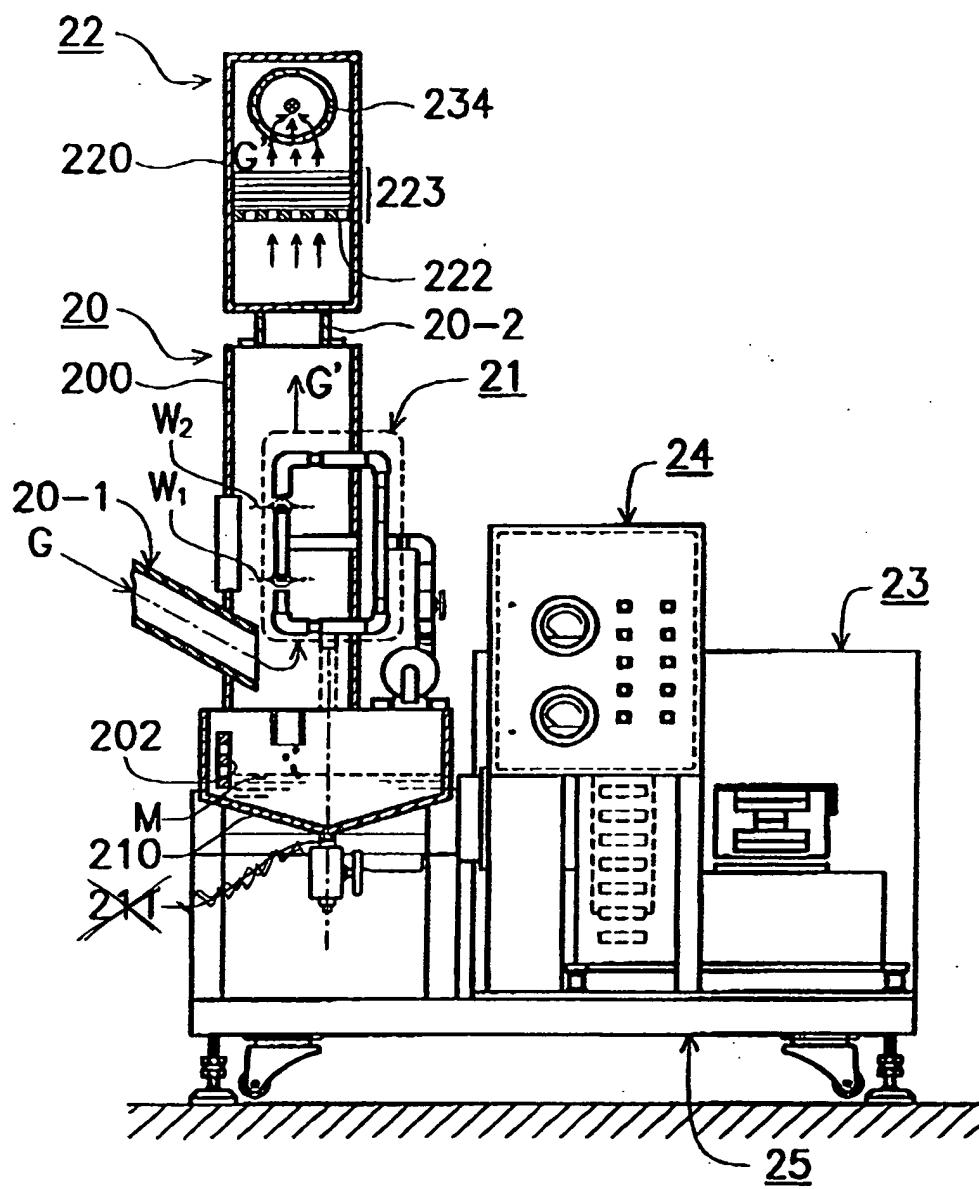


FIG. 1A